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**DEATH OF MORTON G. LLOYD,  
CHIEF OF THE SAFETY CODES  
SECTION**

Morton Githens Lloyd, distinguished engineer and chief of the Safety Codes Section of the Bureau since 1917, died April 26, 1941, after a short illness. He was 66 years of age.

Dr. Lloyd came to the Bureau in 1910 as a laboratory assistant in the Division of Electricity. During his professional career he published numerous papers on the effects of self induction and capacity in alternating-current circuits; thermomagnetic and galvanomagnetic effects in bismuth and tellurium; effects of wave form upon induction meters, core loss, and ratio of transformers and hysteresis; effects of phases of harmonics upon quality of sound; measurement of hysteresis and eddy currents; magnetic hysteresis in a rotary field; regulation of public utilities; accident prevention; and the protection of life and property against lightning.

Dr. Lloyd was active in many national associations, and was a member of the International Electrical Congress, St. Louis, 1904, and Turin, 1911; the International Engineering Congress, San Francisco, 1915; and the Interna-

tional Congress on Illumination, Saranac, N. Y., 1928. He was elected to the honorary research fraternity, Sigma Xi, and received a medal from the Louisiana Purchase Exposition, 1904, and the Edward Longstreth Medal of the Franklin Institute, in 1910.

**FRANK A. WOLFF RETIRES**

On April 30, 1941, Frank A. Wolff, the only surviving member of the Bureau's staff who had been connected with the old Office of Standard Weights and Measures, was retired after 46 years of Federal service.

Dr. Wolff was first employed by the Department of Agriculture in 1895 and subsequently transferred to the Office of Standard Weights and Measures of the Coast Survey, then under the Treasury Department. That office by Act of Congress, on March 3, 1901, was given broader functions and its name was changed to the National Bureau of Standards. Ever since that time, Dr. Wolff has been a member of the Electrical Division and for many years was chief of the Section on Telephone Standards. A special staff meeting in his honor was held at the Bureau on May 9.

<sup>1</sup> Published with approval of the Director of the Budget.

### CONFERENCE OF STATE UTILITIES COMMISSIONS ENGINEERS

The Nineteenth Annual Conference of State Utilities Commission Engineers, held at the Bureau on May 13, 14, and 15, was attended by 38 delegates from 21 States, the District of Columbia, and the Philippines, and by 16 representatives of three Federal Commissions.

The following papers were presented: History of the conference of State utilities commission engineers, J. H. Mathews, Illinois; Recent court and commission decisions, P. L. Holland, Maryland; Fluorescent lighting—its effects on utilities and regulations, Arthur Y. Dunn and Arch Robison, Ohio; Protection of highway grade crossings at railroads, J. T. Hunter, California; Continuous inventory and continuing property records, George P. Steinmetz, Wisconsin; Original cost and the engineer, Melwood W. Van Scyoc, Federal Power Commission; Regulatory problems incidental to customer-owned generating plants, E. I. Rudd, Connecticut; Design of rates for commercial and industrial electric service as affected by value of service consideration, Henry Herz, New Jersey; Performance potentialities of portable-type standard watt hour meters and their recognition as secondary standards by 1940 meter code revision committee, F. A. Wolff, National Bureau of Standards; Separation of property, revenues and expenses of telephone companies, L. R. Bitney, Minnesota; Revision of the National Electric Safety Code, Part II, F. T. McNamara, Connecticut; Discussion of report of the special committee on depreciation, A. B. Greene, Florida; Highlights of the N. A. R. U. C. meeting of interest to the engineer, Eugene H. Merrill, Utah. The program was arranged to permit a thorough discussion of each paper—one of the most valuable features of the meeting.

No copies of the papers presented are available for distribution by the Bureau. In some cases the authors may be able to furnish copies or abstracts; in any event, requests should be addressed to them.

The following recommendations were made by the Policy Committee of the Conference:

1. That the next and future meetings of the Conference be held at the National Bureau of Standards, Washington, D. C.

2. That the date of the next Conference be fixed, at the convenience of the Bureau of Standards, as nearly as

practicable in the middle of May 1942, at such time as will bring about no conflict with meetings of the national engineering societies, which might interfere with attendance at the Conference.

3. That, in the selection of a Conference Secretary, to succeed Dr. Meyer, whose service has done so much to make the conferences successful, we adhere to the former practice by selecting a member of the staff of the Bureau of Standards designated by or approved by the Director of the Bureau.

4. That for next year's Conference, engineers of Federal regulatory commissions be invited to attend and participate in the Conference upon the same basis as the engineers of State commissions.

5. That the data presented by Mr. Mathews in regard to participation of the various State commission engineers in past conferences be made available to all commissions and State governors in the hope that such commissions may permit and arrange for more widespread attendance at future conferences.

Members of the Executive Committee for 1942 are: N. Knowles Davis (Georgia), chairman; F. E. Mindt (New Hampshire), vice chairman; E. C. Crittenden (National Bureau of Standards), secretary; and H. J. Flagg (New Jersey), W. E. Limbocker (Kansas), F. A. Sager (District of Columbia).

### MEETING OF HOROLOGICAL INSTITUTE OF AMERICA

The twenty-first annual meeting of the Horological Institute of America was held in Washington on May 18, 19, and 20, with sessions at the Hotel Washington and the National Academy of Sciences. Since the incorporation of the Institute in 1921, its program for raising the level of watch repairmen in the United States has had the whole-hearted support of the Bureau, and the chief of the Time Section has served as secretary for many years. Repaired watches, submitted as part of the practical test of ability of candidates for the Institute's certificate, have been examined and rated at the Bureau.

At the opening session, the members were welcomed by Albert Barrows, in behalf of the National Research Council, and then listened to the annual address of the president of the Institute, Howard L. Beehler, who presented a report of activities during the year which shows gratifying progress. He called attention to the granting by the Insti-

tute of 34 certified watchmaker's and 71 junior watchmaker's certificates, and the adoption of a licensing law in the State of Ohio. Six articles on practical watch repairing have been prepared and will be given the widest possible distribution. Questionnaires have been mailed to all members, on which special qualifications of each individual will be recorded. These will be filed for possible emergency use, thus making available at least one accurate list of skilled workers in the precision instrument field.

At the following sessions, in addition to the usual committee reports and discussion of regular business, W. E. Workmaster, assistant to James C. O'Brien, Executive Officer of the Civil Service Commission's Roster of Scientific and Specialized Personnel, spoke on the watchmaker's position in the defense program; Dr. L. W. Buss, assistant director of the Mellon Institute of Industrial Research, described a new development in watch lubrication; and Harry W. von Unruh, president of the American National Retail Jewelers' Association, called attention to the value of the Institute's educational program to the jeweler.

At the annual election of officers, Howard L. Beehler was reelected president for the coming year, and 11 members were elected to the Advisory Council. Ralph E. Gould, chief of the Bureau's Time Section, was reappointed secretary. Honorary memberships were granted Captain John F. Hellweg, superintendent of the U. S. Naval Observatory, and T. A. Potter, president of the Elgin National Watch Company, in recognition of their contributions to the science of horology.

#### MEETING OF AMERICAN PHYSICAL SOCIETY

On May 1 and 2 the American Physical Society met at the Bureau for the first two sessions of its 241st meeting. The third session, on May 3, was held at the National Academy of Sciences. The arrangements for the meeting were made by F. G. Brickwedde, chief of the Bureau's Cryogenics Section. Because of the confidential nature of much of the work now in progress in the laboratories, only one paper was presented by a member of the Bureau's staff: Electrical conduction in the glass insulation of resistance thermometers, by Harold J. Hoge. Conduction in the glass seal, through which the platinum leads pass, was studied with the thermometer coil omitted. The apparent conduction con-

sists of a displacement current and probably also of an ionic current. Application of a constant potential causes a large current to flow, which decreases rapidly for several minutes, but is still measurable after an hour or more. Upon removal of the emf and the substitution of a resistance, the discharge current varies in much the same way. Similar behavior has long been observed in Leyden jars. The rate of discharge is greatly increased by heating above the charging temperature. Two precautions are recommended when thermometers of this type are calibrated at the sulfur point: (a) always apply the emf in the same direction, and (b) allow the current to flow for several minutes before taking the first measurement, so that the displacement current will have fallen to a relatively low value.

A particularly interesting symposium on "Electrical measurements as tools in biological research" was held on the evening of May 1, following an informal dinner. Three invited speakers—J. L. Oncley, Kenneth S. Cole, and D. W. Bronk—spoke on Electrical characteristics of protein solutions, Electrical characteristics of cell membranes, and Electrical aspects of biological functions. An animated informal discussion followed, which brought out some interesting facts concerning early experiments in this field.

A second symposium on nuclear energy sources in stars, under the sponsorship of Professor G. Gamow, of George Washington University, was held at the National Academy of Sciences on the afternoon of May 3.

The society dinner, at Wardman Park Hotel on the evening of May 2, was attended by 350 members and their guests. The principal speakers were Professor Charles G. Darwin, Director of the National Physical Laboratory, and Sir Lawrence Bragg, Cavendish Professor of Experimental Physics at the University of Cambridge.

#### A TEST OF LENS RESOLUTION FOR THE PHOTOGRAPHER

The introduction of the miniature camera has greatly stimulated interest in photography and has resulted in the development of a large group of amateur photographers, many of whom are skilled technicians. As a consequence of this development, the Bureau receives a large number of inquiries concerning the relative merits of photographic lenses. It is not practicable for the Bureau continually to test the

different lenses that are currently available and to publish ratings of their performance.

Circular C428, *A Test of Lens Resolution for the Photographer*, has been published in order to provide the camera user with a method of testing his own lenses. Twelve accurately engraved test charts form a part of this circular, and if these are used in accordance with instructions a measure of the resolving power of a lens can be made in the home. Such a determination of the resolving power provides a quantitative measure by which the merits of different lenses can be compared. Although this test can be made at home with equipment ordinarily available to the technically inclined amateur photographer, a description is included of more elaborate apparatus which might profitably be installed by camera clubs to provide for the convenient testing of lenses by their members.

Copies of C428 are now on sale by the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 40 cents.

To accommodate those who desire extra charts but who do not need an additional copy of the circular, sets of eight pages of charts (each sheet  $5\frac{1}{2}$  by 9 in., and carrying six charts), have been bound with a single page of explanatory material to form Miscellaneous Publication M166. This publication is obtainable from the Superintendent of Documents at \$1.25 a copy.

#### SAFE PRACTICES IN RADIUM DIAL-PAINTING INDUSTRY

Safe practices in the handling of radioactive luminous compound in the dial-painting industry are set forth in Handbook H27, which has just been released. This manual has been prepared by a special committee appointed by the Director of the Bureau, and having the following members: Captain Charles S. Stephenson, Bureau of Medicine and Surgery, Navy Department, Washington, D. C.; J. E. Paul, United States Radium Corporation, New York, N. Y.; George T. Taylor, Radium Chemical Co., Inc., New York, N. Y.; R. D. Evans, Massachusetts Institute of Technology, Cambridge, Mass.; Frederick B. Flinn, director of Industrial Hygiene, Columbian University, New York, N. Y.; Garrison S. Martland, chief medical examiner of Essex County, Newark, N. J.; G. Falla, Memorial Hospital, New York, N. Y.; J. S. Rogers, Division of Labor Standards, Department of Labor, Wash-

ington, D. C.; and L. F. Curtiss, National Bureau of Standards, Washington, D. C., chairman.

Increased activity in the radium-dial industry has led to many requests for the preparation of a guide for the many new people who will be drawn into this work, thus avoiding the injuries that occurred, mainly through ignorance, in the early days.

Copies of H27 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 10 cents.

#### SPECTROPHOTOMETRIC DETERMINATION OF PRASEODYMIUM, NEODYMIUM, AND SAMARIUM

Attempts to analyze materials composed essentially of the rare earth elements have not been particularly successful because these elements are so nearly identical in their chemical and their physical properties. Many of the rare earth elements, however, form salts which give rise to characteristic absorption bands when their solutions are observed by means of a spectroscope. As reported in the *Journal of Research* for June (RP1395), Clement J. Rodden has taken advantage of this property to determine these elements without separating them chemically.

Three of the rare earths which form colored solutions—praseodymium, neodymium, and samarium—can be determined with a fair degree of accuracy by measuring the transmittancy of light through their solutions.

By determining the relation between the spectral transmittancy and concentration of essentially pure salts of praseodymium, of neodymium, and of samarium, curves have been constructed by means of which mixtures of these three elements have been analyzed. In addition, the effect of other rare earth elements, particularly lanthanum, in the determination of each of the three elements in question, as well as the effect of each of the three on the others, was ascertained, so that appropriate corrections can be applied.

The region of the spectrum studied ranged from  $350 \text{ m}\mu$  to  $1,000 \text{ m}\mu$ . Spectral transmittancy curves for lanthanum, cerium, praseodymium, neodymium, samarium, europium, and gadolinium were obtained by means of a photoelectric spectrophotometer. The absorption band found to be most suitable for the determination of praseodymium was at  $446\text{m}\mu$ , for neodymium

the bands at  $521\text{ m}\mu$  and  $798\text{ m}\mu$ , and for samarium,  $402\text{ m}\mu$ .

A suggested procedure is indicated for the analysis of mixtures of the cerium group of rare earths, obtained by precipitation of their double sulfates in the course of a mineral analysis.

### X-RAY PATTERNS OF SOME LEAD COMPOUNDS

X-ray diffraction data, as determined from powder patterns of 10 compounds occurring in the systems  $\text{PbO-B}_2\text{O}_3$  and  $\text{K}_2\text{O-PbO-SiO}_2$ , are published by Howard F. McMurdie in the June Journal of Research (RP1392), as a supplement to the phase-equilibrium work previously reported on these systems. These data may be useful in related studies for identification of phases. The unit cell of  $\text{K}_2\text{O}_2\text{PbO}_2\text{SiO}_4$  was determined and a possible atomic arrangement outlined.

### ANALYSIS OF DENTAL AMALGAMS

The physical properties of dental amalgams are significantly affected by the amount of mercury in the hardened alloy. Numerous techniques have been described in the dental literature for controlling this factor. In order to determine the effectiveness of these procedures, a chemical analysis of the actual restoration must be made. This is difficult because of the presence of both silver and mercury in the amalgam. With usual methods of analysis of such materials, mercury is determined on a separate sample. This procedure is not feasible for the smaller dental restorations where so little material is available.

Harold J. Caul, research associate of the American Dental Association, and Irvin C. Schoonover, of the Bureau's Chemistry Division, have developed a new procedure for the separation and determination of gold, silver, mercury, tin, copper, and zinc in dental amalgams. As described in RP1391 in the Journal of Research for June, the chief features of the new method are: (1) large samples of material are not necessary, (2) a separate sample is not required for the determination of mercury, and (3) the method is rapid and convenient.

A simplification of the procedure is presented for use when the composition of the silver alloy is known, or when a partial analysis for silver and mercury is desired, as is often the case in control work.

### DETERMINATION OF CARBON MONOXIDE

Joseph R. Branham, Martin Shephard, and Shuford Schuhmann, of the Bureau's Chemistry Division, are investigating the accuracy and reproducibility of existing methods of gas analysis. One of the papers reporting results of this investigation will be published as RP1396 in the Journal of Research for June. In this work, carbon monoxide of known purity was analyzed by the slow-combustion method. The contraction after burning, the carbon dioxide produced, and the oxygen consumed were measured. Apparatus with and without rubber connections were used. The distinct effect of the amount of liquid water present within the combustion pipette and burette was measured. Analyses were performed with all the gases dry, as well as saturated with respect to water vapor. The stoichiometric relationship representing ideal physical and chemical conditions is  $2\text{ CO} + \text{O}_2 \rightarrow 2\text{ CO}_2 + \text{TC}$  (where  $\text{TC}$  = total contraction after burning); the observed relationship representing average laboratory practice by the customary method and apparatus was  $2\text{ CO} + 1.001\text{ O}_2 \rightarrow 1.986\text{ CO}_2 + 1.014\text{ TC}$ . The purity of the sample, expressed as percent by volume, was known to be better than 99.99. The purity determined by analysis varied from 99.13 to 101.74, depending upon the measurement selected for calculation. Best results were obtained by computing CO from  $\text{TC} + \text{CO}_2$ ; the purity so indicated was  $100.01 \pm 0.04$ . The departure from the stoichiometric relationships was all accounted for experimentally and theoretically.

### DETERMINATION OF FREEZING POINTS

In RP1397 by Beveridge J. Mair, Augustus R. Glasgow, Jr., and Frederick D. Rossini, which will be published in the Journal of Research for June, simple time-temperature freezing and melting curves are analyzed, and a procedure is outlined for determining from them the freezing point of a given substance and the amount of impurity in it. The procedure was applied to a number of different known solutions of hydrocarbons ranging from 0.006 to 0.115 mole fraction in concentration of solute. For the systems examined, it was found that the values for the freezing point of a given substance obtained from both freezing and melting curves were always in accord within their re-

spective limits of uncertainty, and that the estimated amount of impurity was in error by not more than about 10 percent of itself, on the average.

#### COMPARATIVE TESTS OF CHEMICAL GLASSWARE

Three brands of borosilicate glass are produced in the United States in the form of beakers, flasks, and other apparatus for general laboratory use. These three wares are chemical Pyrex, Kimble Glass Co's No. 51a, and Tamworth-Glasbake. A series of tests to determine the relative resistance of these wares to attack by various chemical reagents and to mechanical and thermal shock was recently completed at the Bureau, and the results will be published as RP1394 by Edward Wileman, Alfred N. Finn, and W. Stanley Clabaugh in the June Journal of Research.

The chemical composition of each ware and its thermal expansivity were also determined. A new type of glass, Corning Glass Works' 96 percent silica glass No. 790, known as Vycor, was included in some of the comparative tests.

#### WEARING QUALITY OF CURRENCY PAPERS

Replacing worn out paper currency costs the Federal Government several million dollars each year. Research at the Bureau, in cooperation with the Bureau of Engraving and Printing, has resulted in improvement of the quality of currency paper, but at the same time conditions of use have grown more severe. The problem, therefore, continues to be important. To tell whether or not a change in the paper is actually an improvement is something of a problem in itself, because service tests of paper currency in circulation require much time, and it is difficult to get adequate returns on comparable treatments. Hence, a quick laboratory wear test that will simulate the kind of treatment that paper currency gets in circulation is much needed.

Frederick T. Carson and Vernon Worthington, of the Bureau's Paper Section, have recently developed a wear test that meets this need. It is particularly adapted to determining the relative wearing quality of a given type of paper that has been treated in various ways to improve its performance. The test is made in two stages. First, a square of the paper is crumpled to a certain volume by means of a piston

working in a cylinder. Then mechanical fingers straighten and smooth the paper, and a mechanism rolls the paper up and puts it back in the cylinder, where it is again crumpled. This is repeated many times until the paper looks and feels very much like paper currency that has been in circulation for several months, although the artificial wearing-out process requires only a few minutes. The whole process is completely automatic, and at the end of a specified amount of treatment the crumpling apparatus stops. In the second stage of the test the amount of damage that has resulted from the crumpling treatment is determined. Strength and stiffness are sometimes measured, but the most valuable criterion has been found to be the change in the rate at which air will flow through the paper under a given pressure. This shows how much the structure has been opened up, which is closely related to the roughness or fuzziness of the surface, its ability to catch dirt and absorb oil and grease, and the probability of impairment of printed images and characters on the paper, as well as the change in strength and stiffness. This second stage in the test is accomplished chiefly by means of a new permeameter developed by F. T. Carson especially for this work.

These instruments have been very helpful in predicting quickly the probable improvement to be expected from a given change in the paper used for paper currency. The standardization and improvement of these instruments are being continued and the method for determining the relative wearing quality of currency-type papers is constantly being improved.

The complete account of this work will be published as RP1390 in the June number of the Journal of Research.

#### MATERIALS IN SOIL CORROSION TESTS

Many lines of industry including petroleum refining, railway transportation, chemical manufacture, etc., have been confronted with serious corrosion problems. By careful selection of alloys developed to resist corrosion under specific environmental conditions, the life of equipment in these and other industries has been considerably prolonged. Since many of these materials have been shown to be resistant to sea and other natural waters, dilute acid and alkaline solutions, organic acids, sulfur compounds, reducing environments, or to other factors or conditions

characteristic of corrosive soils, it is important to determine the suitability of these materials for service underground.

At several times, beginning in 1922, specimens of corrosion-resistant ferrous and nonferrous metals and alloys, metallic and nonmetallic coatings, and miscellaneous materials were buried at a number of test sites located in soils in which the corrosive factors differed widely in nature and intensity. A series of progress reports on this investigation has been prepared, but in no single report can a description be found of all of the materials which are under test or for which corrosion data are available. In order that metallurgists, corrosion engineers, and others concerned with the behavior of metals underground may have available in convenient form a list of the materials which have been included in the investigation, a description of all such materials of general interest has been prepared by I. A. Denison, of the Underground Corrosion Section, for distribution as Letter Circular LC646, entitled "Materials in the National Bureau of Standards Soil-Corrosion Tests." The significant features of the various materials are discussed from the standpoint of their resistance to corrosion in soils and in other environments in which the same corrosive factors are present. The specific contribution of the various alloying elements to corrosion resistance is discussed for the different types of materials.

#### INDENTATION CHARACTERISTICS OF FLOOR COVERINGS

In a building where personal comfort in walking or fatigue of the occupants is important, a floor covering which yields readily under foot is to be desired. However, unless this property is coupled with an ability to recover to normal shape upon the removal of concentrated loads, the covering will soon present an irregular surface which would be unsightly and difficult to clean. Furniture placed on a soft type of floor covering should have as large a bearing area as practical. Undersized casters or glides or the edges of chair and table legs which are not squarely on the floor are frequently the cause of permanently indented and disfigured floor coverings. If a floor covering must, in normal service, be exposed to highly concentrated and prolonged loads or abusive impacts, a soft type of covering should not be used. The harder types of floors are

more likely to be the least damaged or marred in such service.

The indentation characteristics of 64 floor coverings were determined at the Bureau as part of the research program on building materials suitable for low-cost house construction. Indentation and recovery determinations were made on specimens conditioned in an atmosphere of 65-percent relative humidity and 72° F temperature, on specimens exposed to accelerated aging, and on specimens at an elevated temperature of 90° F. The floor coverings tested included such general types as linoleum, cork, rubber, felt base, asphalt, wood, fiberboard, and monolithic compositions. Variations in composition and thickness were included in many of the types.

In Building Materials and Structures Report BMS73, recently released, the results are summarized and presented in graphic form to show the relative merits of the various floor coverings with respect to their ability to yield under foot, or comfort value, and their resistance to permanent indentation under a concentrated load. Most of the linoleums and the softer types of rubber floor coverings possessed a good combination of comfort value and resistance to permanent indentation. Among the harder types of floors or those having less comfort value than the softer types, oak and maple wood floors, pressed fiberboard, magnesium oxychloride floors, and a cement-mortar topping showed very good resistance to permanent indentation under a concentrated load. The indentation characteristics of the felt-base coverings, as a whole, were not satisfactory. Although they had a fair comfort value, their resistance to concentrated loads was poor. However, it is wrong to conclude that this group of floor coverings should not be considered. Their initial cost is comparatively low and they may render economical and satisfactory service for some types of occupancy, provided they are amply protected from concentrated loads and abuse.

Copies of BMS73 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 10 cents.

#### NEW AND REVISED PUBLICATIONS ISSUED DURING MAY 1941

##### Journal of Research<sup>2</sup>

Journal of Research of the National Bureau of Standards, volume 26, number 4, April 1941 (RP1375 to RP1382,

See footnote on p. 56.

PUBLIC DOMAIN  
56-2-1941

## TECHNICAL NEWS BULLETIN

inclusive). Price 30 cents. Annual subscription, 12 issues, \$3.50.

### Research Papers<sup>2</sup>

[Reprint from *Journal of Research for February 1941*]

RP1365. Boiling points of benzene, 2,2,3-trimethylbutane, 3-ethylpentane, and 2,2,4,4-tetramethylpentane within the range 100 to 1,500 millimeters of mercury. Edgar Reynolds Smith. Price 5 cents.

### Building Materials and Structures Reports<sup>3</sup>

[Persons who wish to be notified of new publications in the Building Materials and Structures series as soon as they are available should write to the Superintendent of Documents, Government Printing Office, Washington, D. C., asking that their names be placed on the special mailing list maintained by him for this purpose.]

BMS73. Indentation characteristics of floor coverings. Percy A. Sigler and Myrtle B. Woodward. Price 10 cents.

### Circulars<sup>4</sup>

C428. A test of lens resolution for the photographer. (With test charts.) Irvine C. Gardner. Price 40 cents.

### Handbooks<sup>5</sup>

H27. Safe handling of radioactive luminous compound. Price 10 cents.

### Simplified Practice Recommendations<sup>6</sup>

R126-41. Set-up paper boxes (used by department and specialty stores). (Supersedes R126-31.) Price 5 cents.

R127-41. Folding paper boxes (used by department and specialty stores). (Supersedes R127-31.) Price 5 cents.

R129-41. Notion and millinery paper bags (used by department and specialty stores). (Supersedes R129-31.) Price 5 cents.

R177-41. Single-faced corrugated-board rolls (used by department and specialty stores). Price 5 cents.

### Miscellaneous Publications<sup>7</sup>

M166. Charts for testing lens resolution. (8 pages of charts.) Irvine C. Gardner. Price \$1.25.

### Technical News Bulletin<sup>8</sup>

Technical News Bulletin, 289, May 1941. Price 5 cents. Annual subscription, 50 cents.

<sup>2</sup> Send orders for publications under this heading only to the Superintendent of Documents, Government Printing Office, Washington, D. C. Subscription to *Technical News Bulletin*, 50 cents per year; *Journal of Research*, \$3.50 per year (to addresses in the United States and its possessions, and to countries extending the franking privilege); other countries, 70 cents and \$4.50, respectively.

## MIMEOGRAPHED MATERIAL

### Letter Circulars

[*Letter Circulars* are prepared to answer specific inquiries addressed to the National Bureau of Standards and are sent only on request to persons having definite need for the information. The Bureau cannot undertake to supply lists or complete sets of *Letter Circulars* or send copies automatically as issued.]

LC632. Sound absorption coefficients of the more common acoustic materials. (Supersedes LC573.)

LC633. Classification of acoustic materials. (Supersedes LC585.)

LC635. Radiometry: Publications by the staff of the National Bureau of Standards. (Supersedes LC448.)

LC636. Acoustics: Publications by members of the staff of the National Bureau of Standards. (Supersedes LC380.)

LC641. Cement: Publication by members of the staff of the National Bureau of Standards, together with a list of Federal Specifications. (Supersedes LC494.)

LC642. Concrete and reinforced concrete: Publications by members of the staff of the National Bureau of Standards, together with a list of Federal Specifications. (Supersedes LC495.)

LC643. Structural clay products, stone, and masonry: Publications by members of the staff of the National Bureau of Standards, together with a list of Federal Specifications. (Supersedes LC496.)

LC646. Materials in the National Bureau of Standards soil-corrosion tests.

## RECENT BUREAU ARTICLES APPEARING IN OUTSIDE PUBLICATIONS<sup>9</sup>

Recent applications of radio to the remote indication of meteorological phenomena. Harry Diamond. *Electrical Engineering* (33 West 39th St., New York, N. Y.) 60, 163 (April 1941).

A sensitive frequency meter for the 30 to 340-megacycle range. E. L. Hall. *Electronics* (330 West 42nd St., New York, N. Y.) 14, No. 5, 37 (May 1941).

The definition of black and white. Deane B. Judd. *Am. J. Psychology* (Morrill Hall, Cornell University, Ithaca, N. Y.) 54, 289 (April 1941).

<sup>9</sup> These publications are not obtainable from the Government. Requests should be sent direct to the publishers.

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